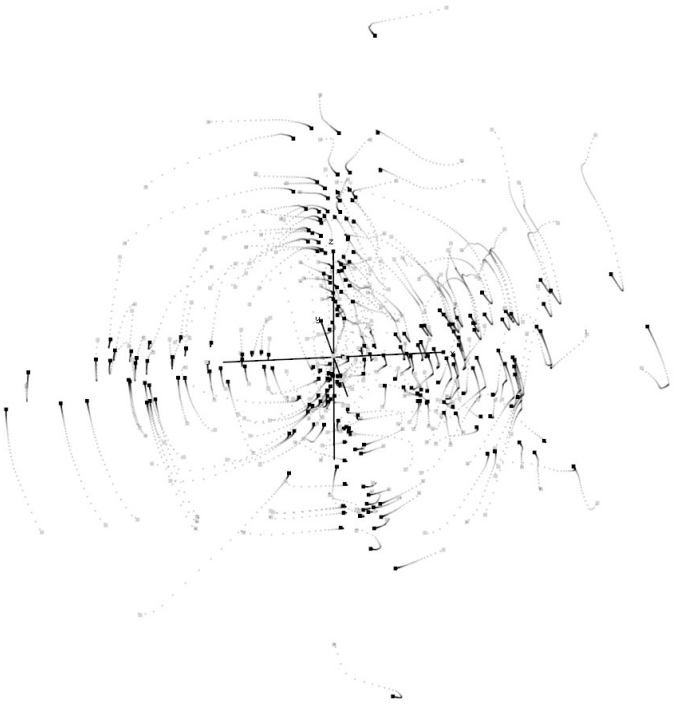
Basis for Dynamical Approaches to Personality: Network-Space Framework



Basis for Dynamical Approaches to Personality

Network-Space Framework

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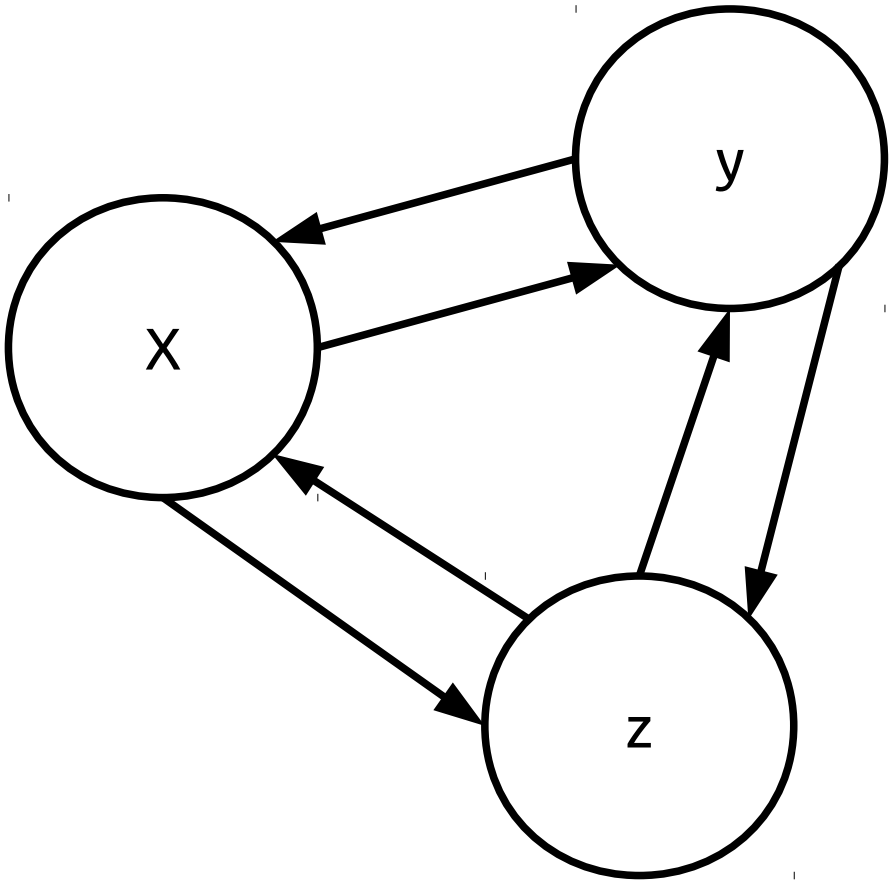
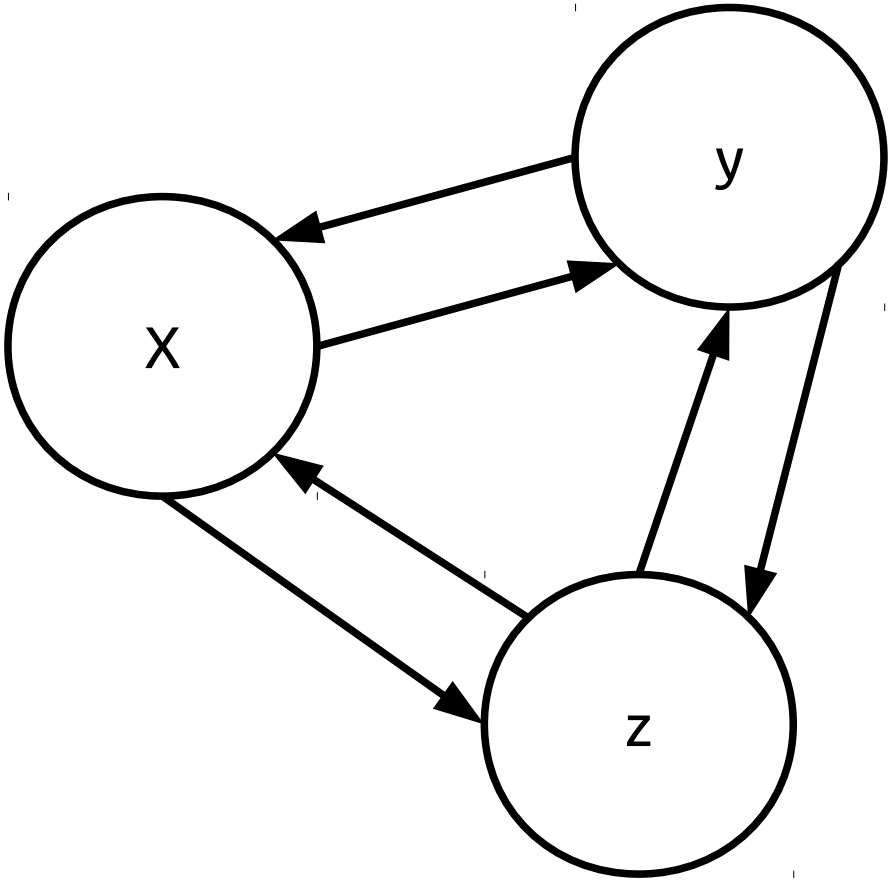
- Conceptual and mathematical toolbox
- For representing within- and between-individual processes
- For building dynamic models
- For hosting and integrating existing ideas
- For generating new ideas
- For building computational models

- People are scaled on characteristics – nodes
- Nodes are placeholders

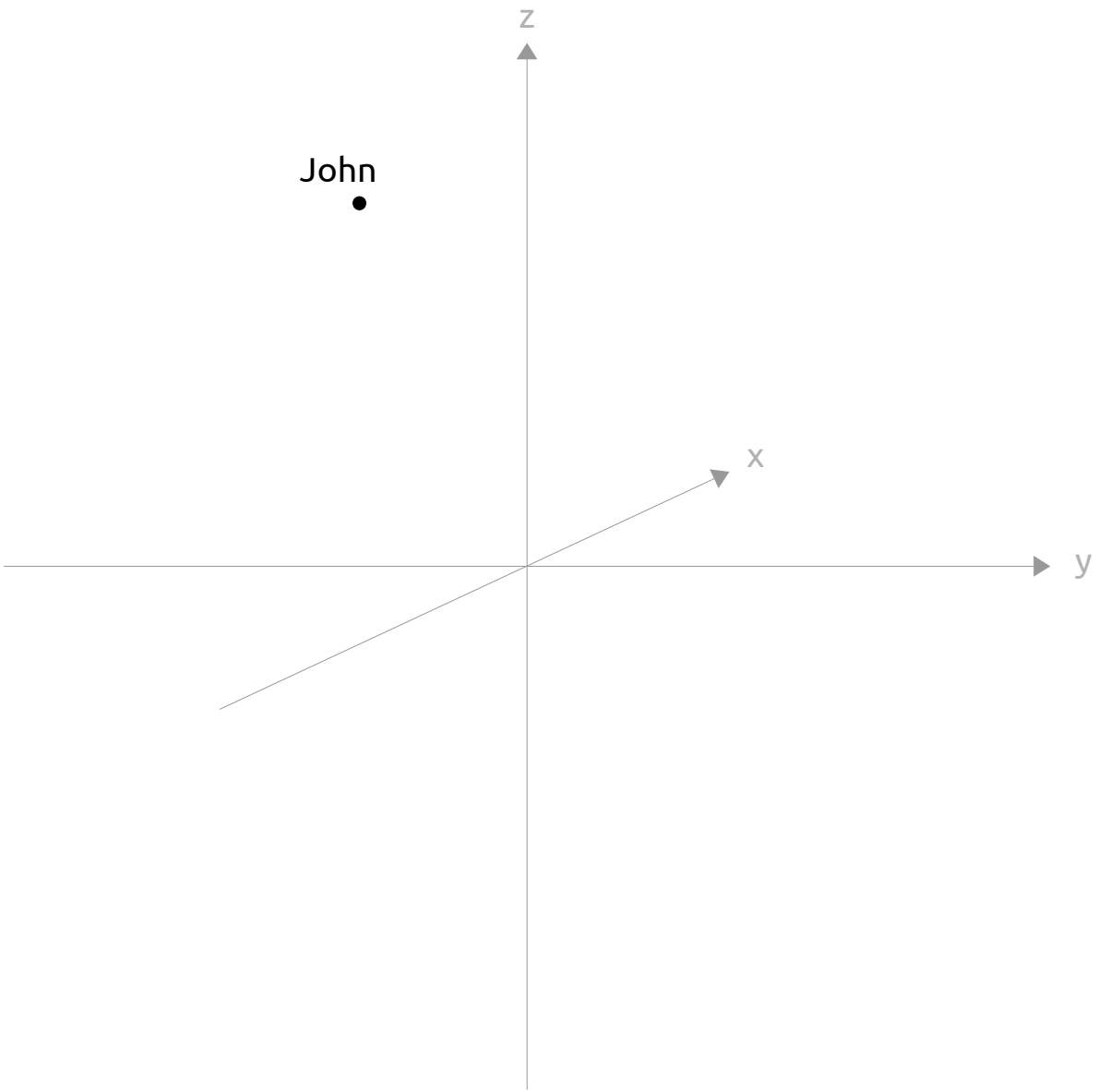
person = (x, y, z)

Within-individual representation of personality

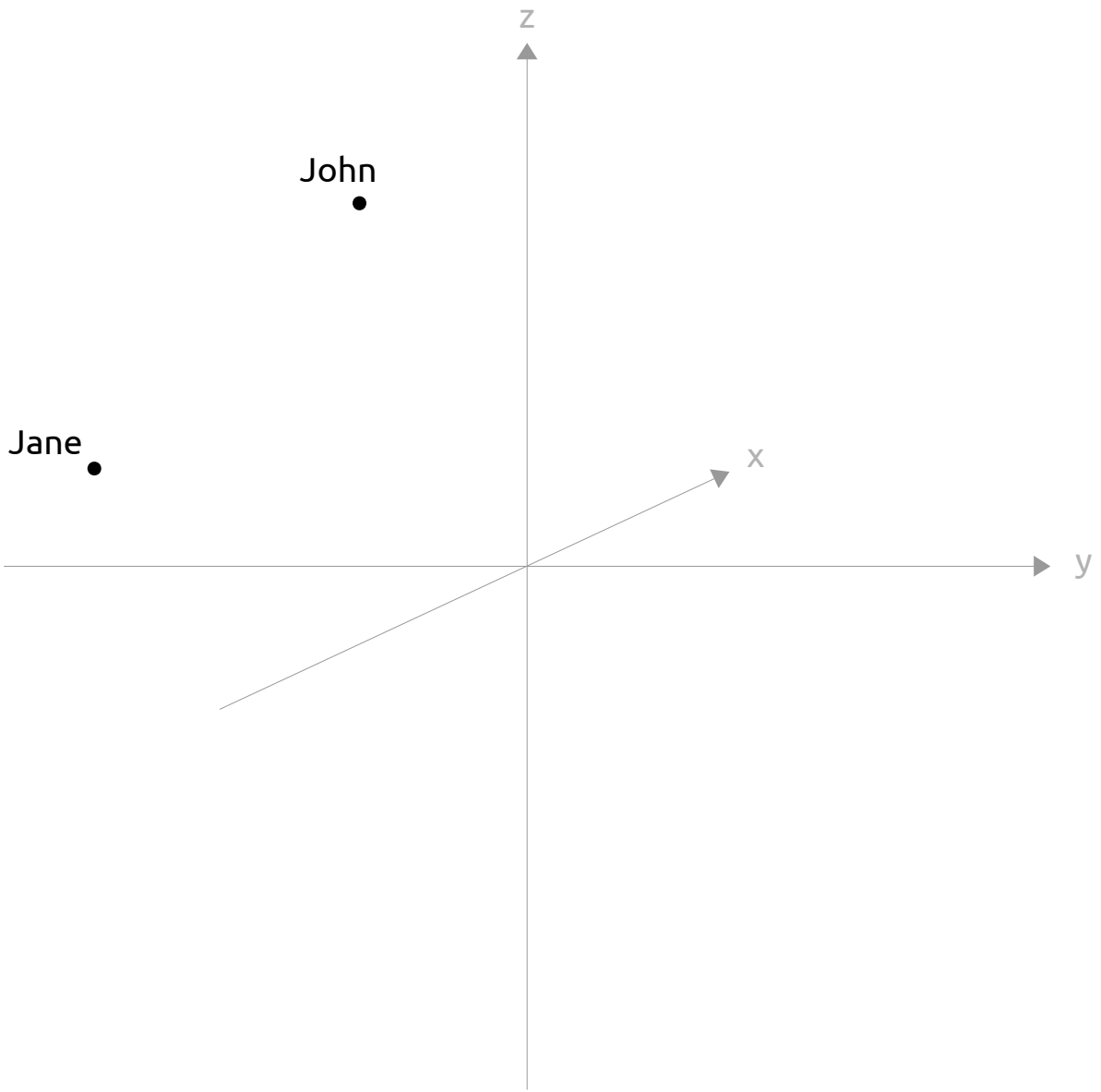




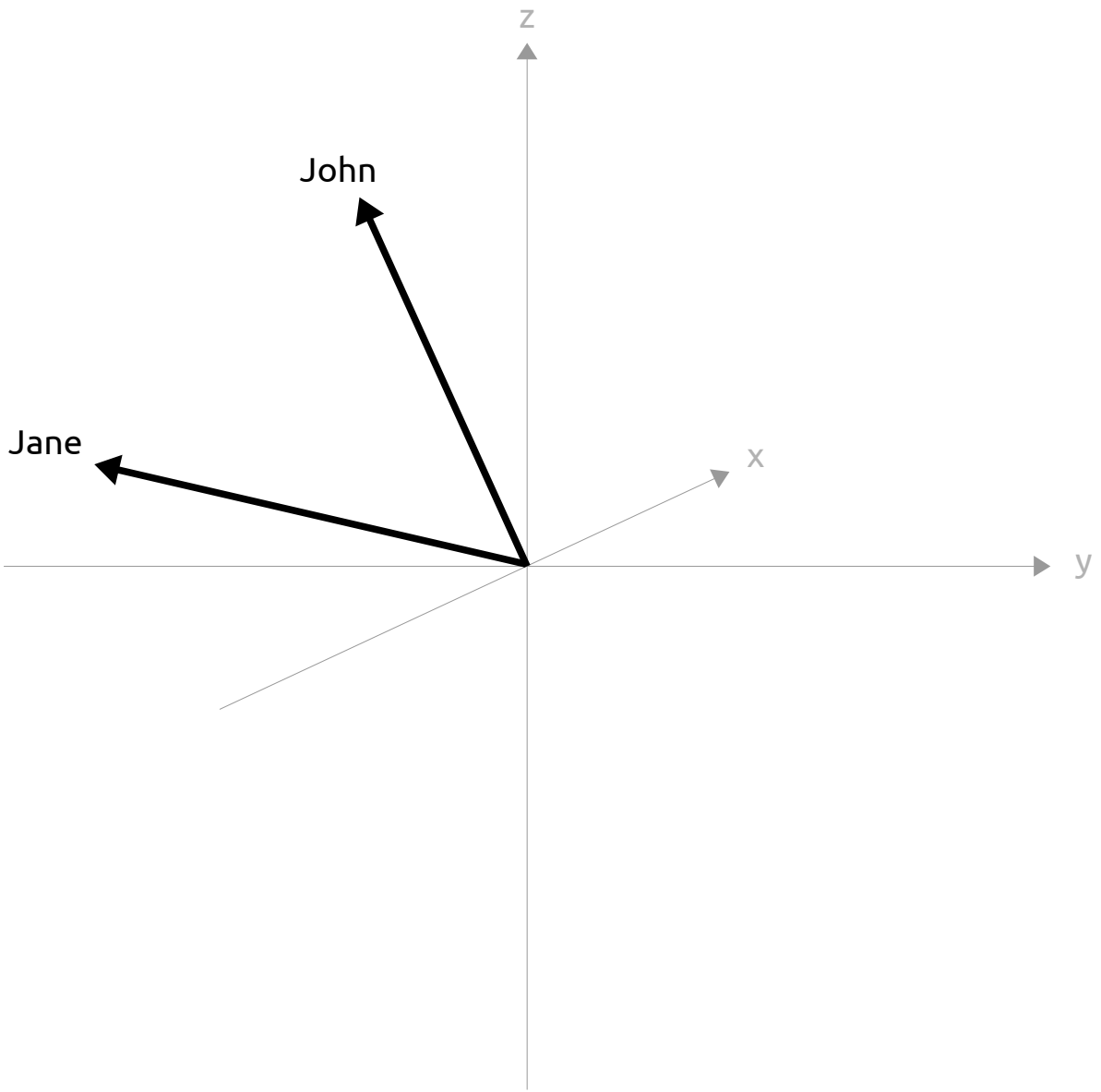
$$\begin{pmatrix} -.26 & -.29 & .02 \\ -.22 & -.24 & .05 \\ .03 & .10 & -.50 \end{pmatrix}$$



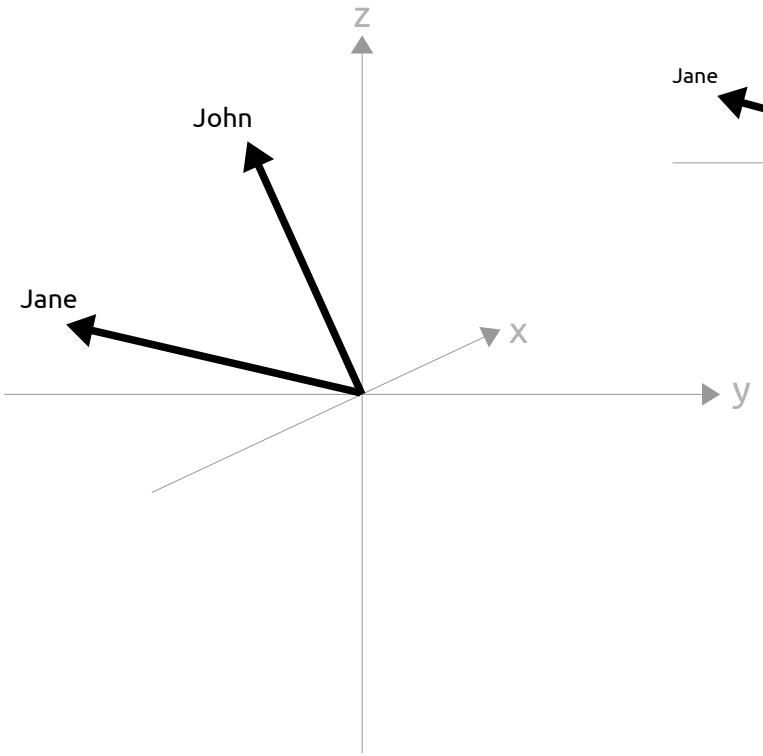
Personality space

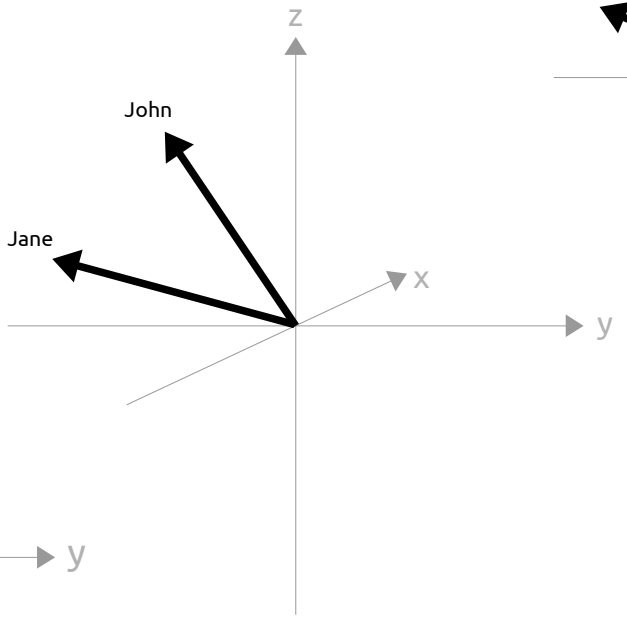


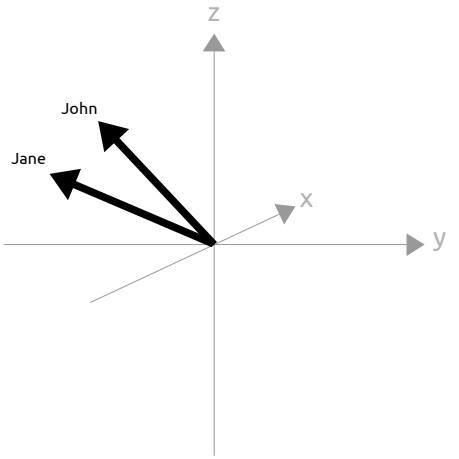
Between-individual representation of personality

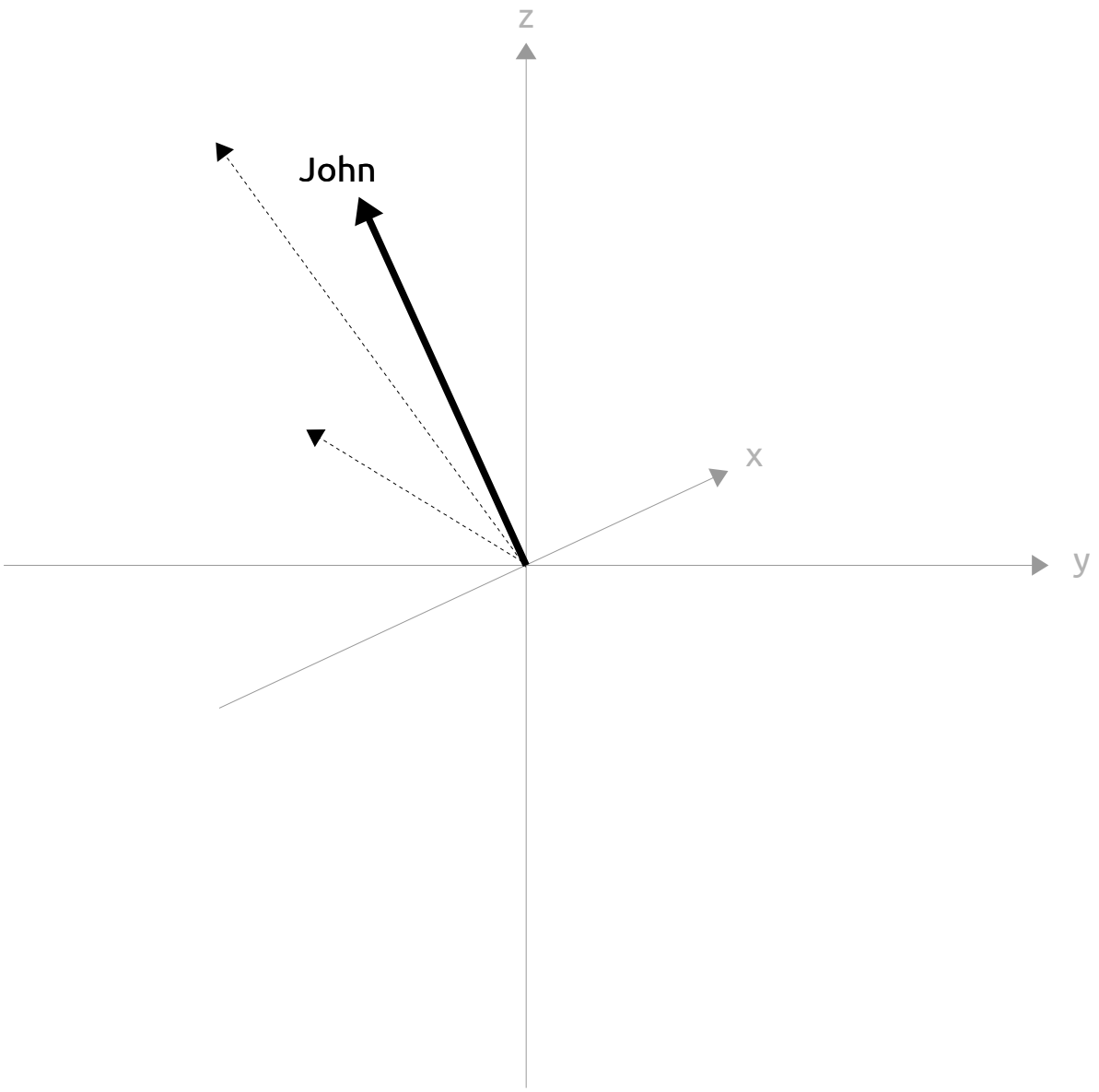


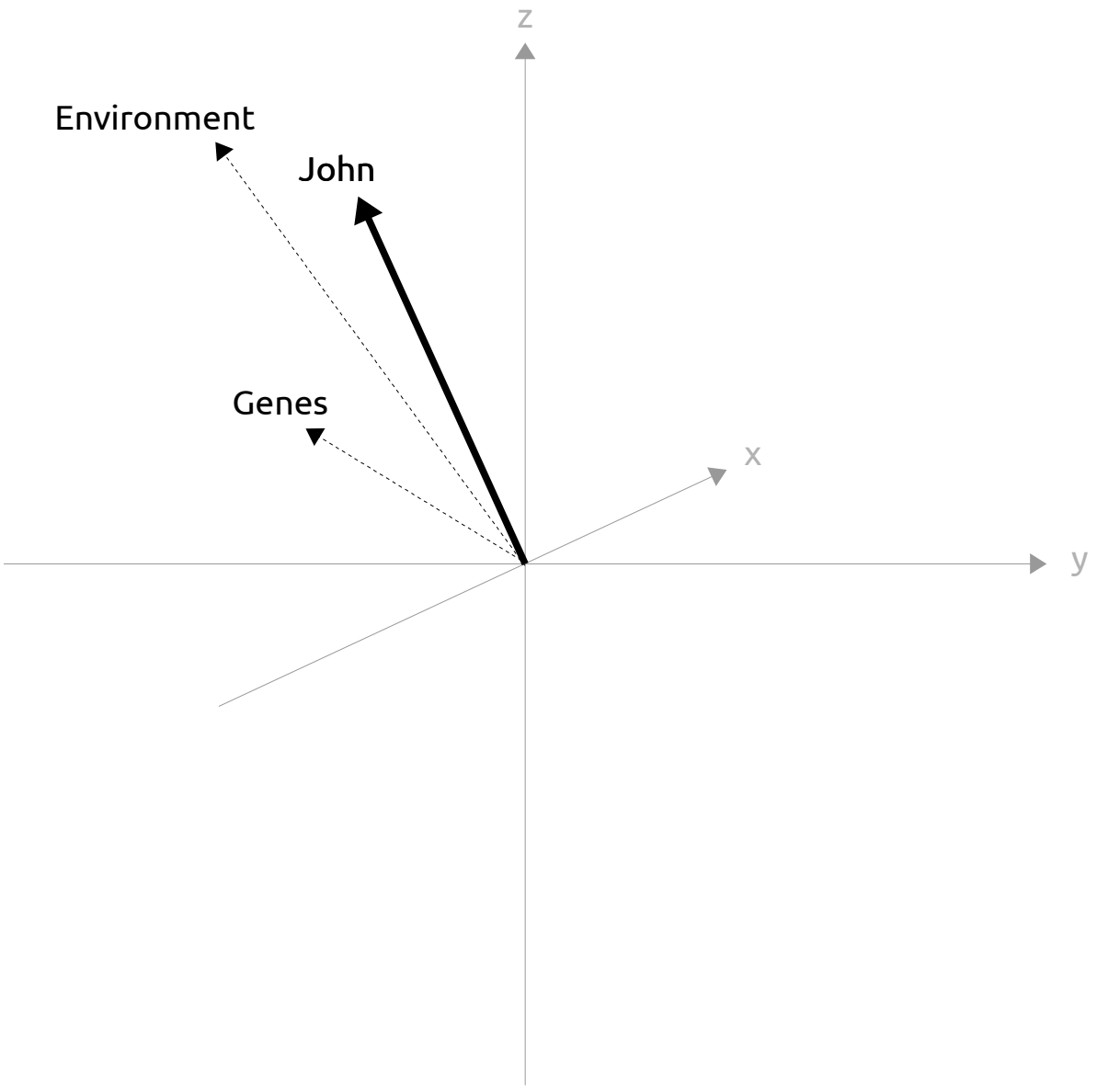
Between-individual representation of personality

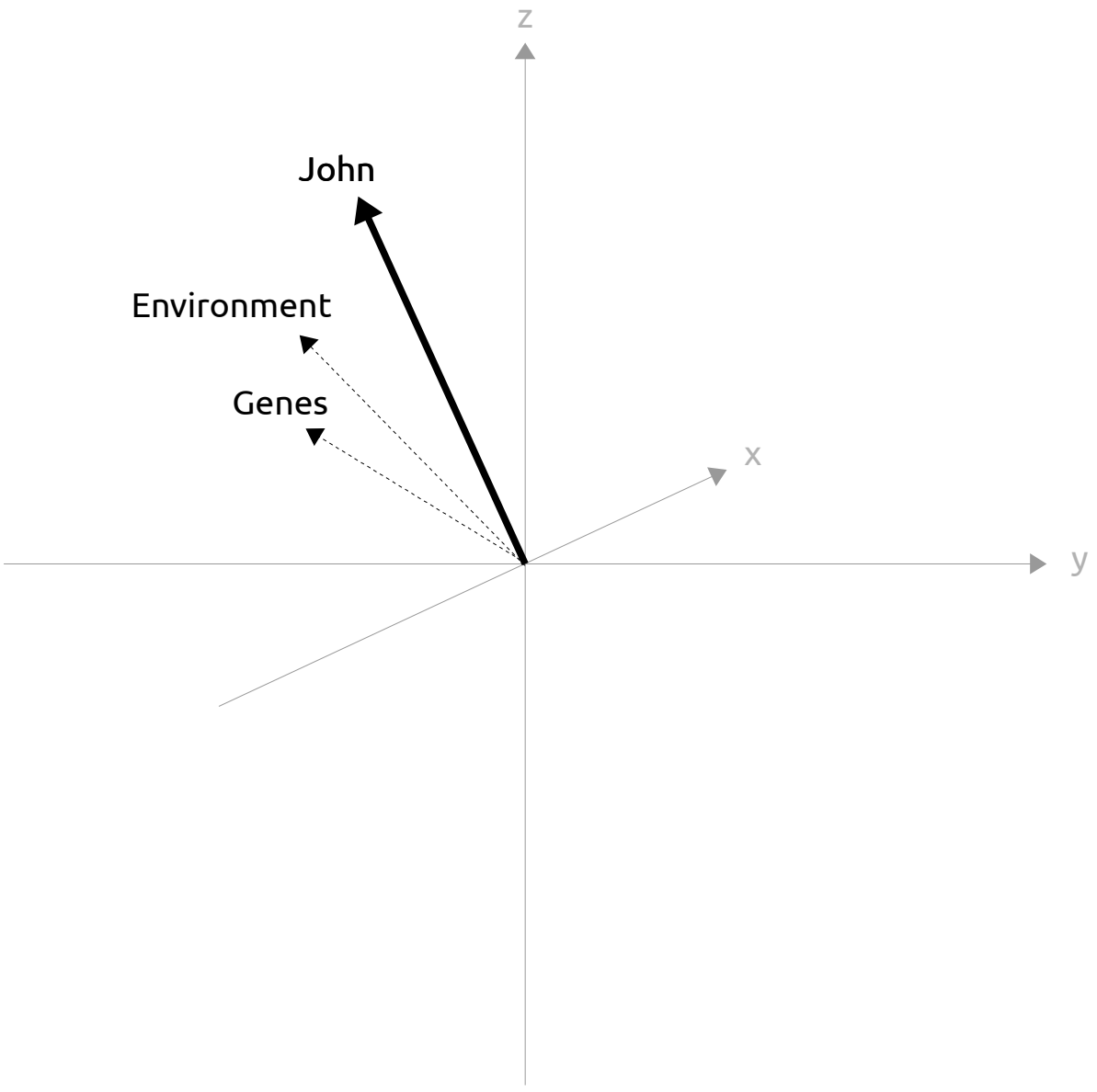

z
John
Jane
x
y

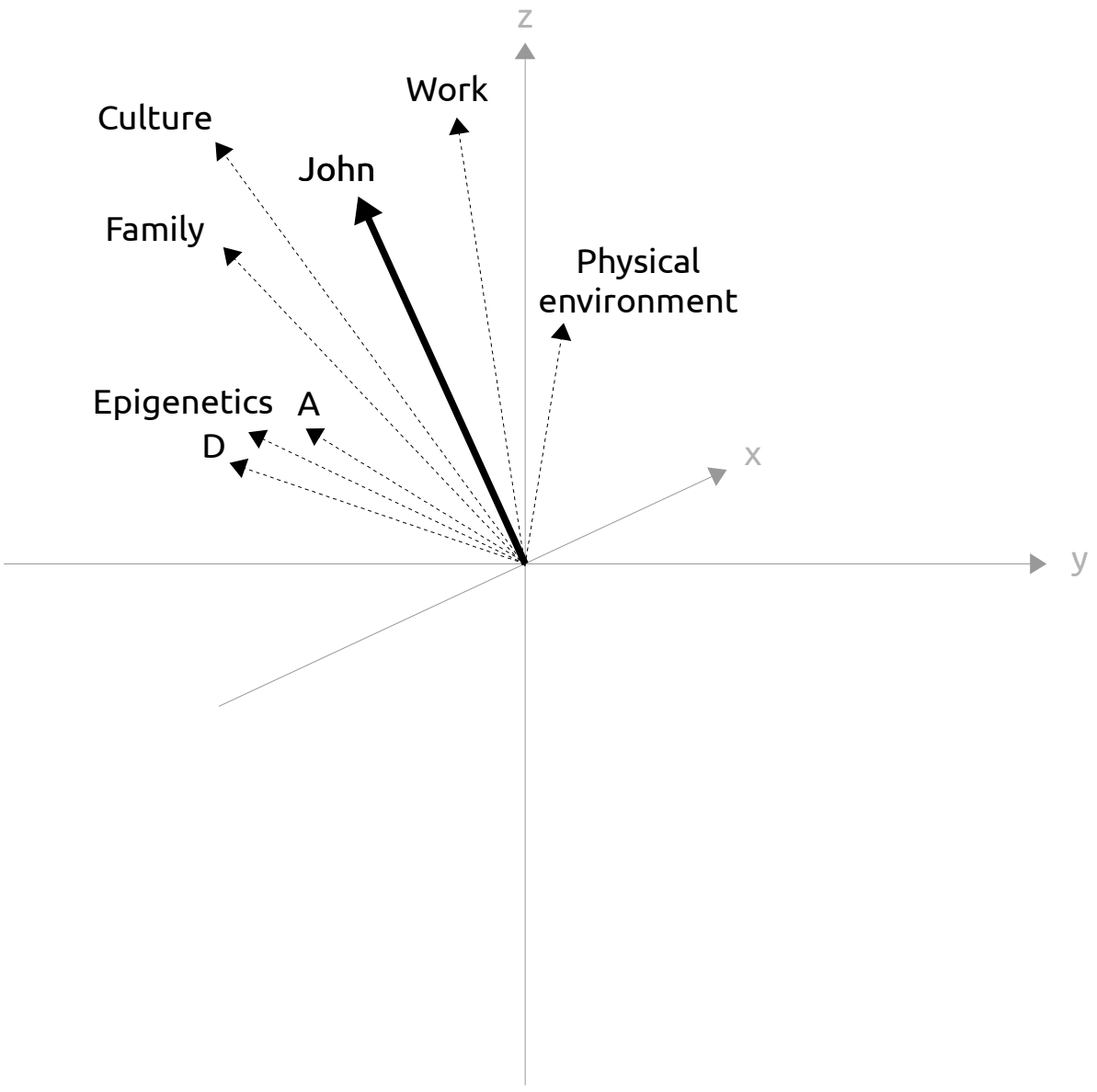

z
John
Jane
x
y

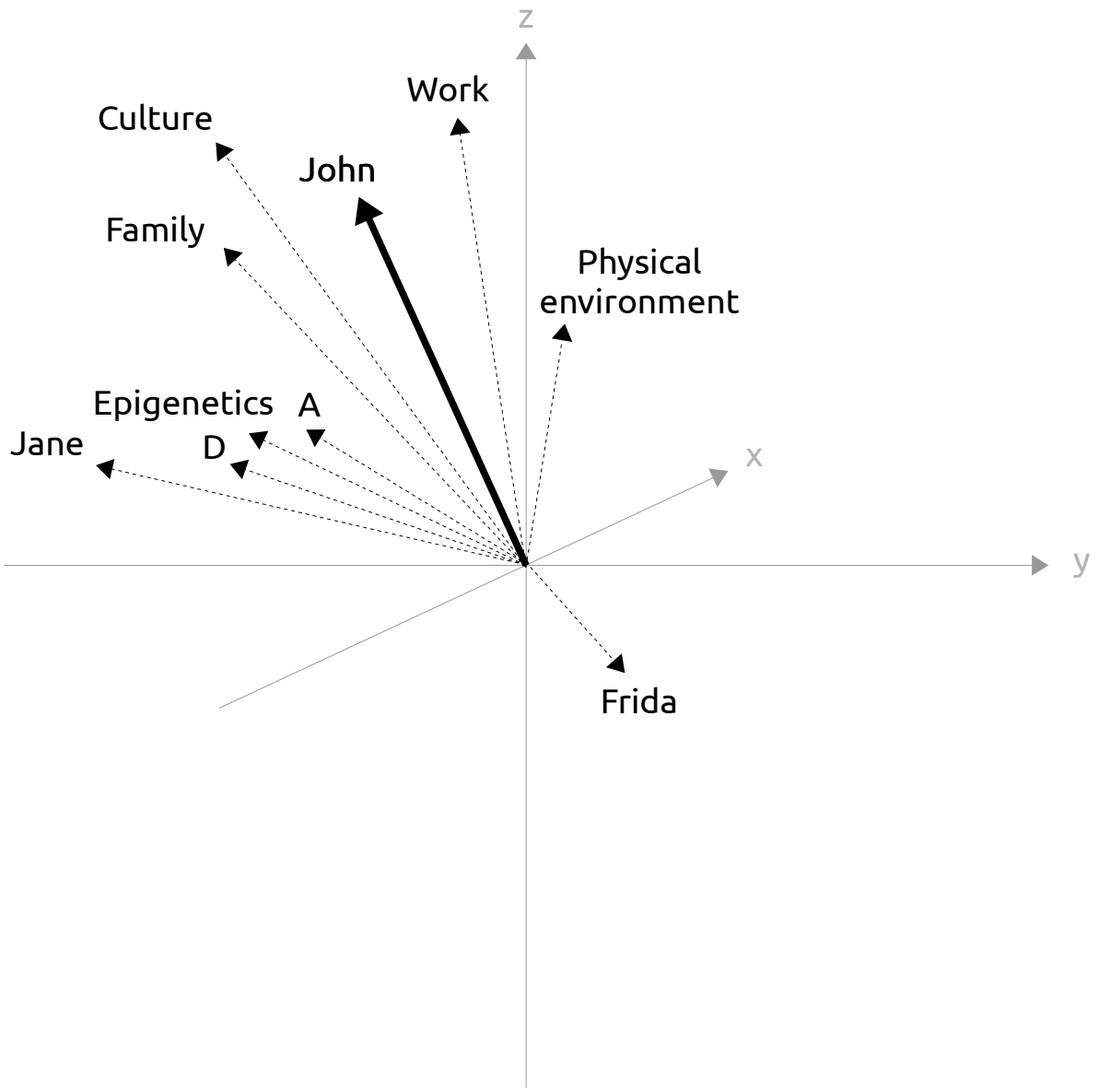

z
John
Jane
x
y

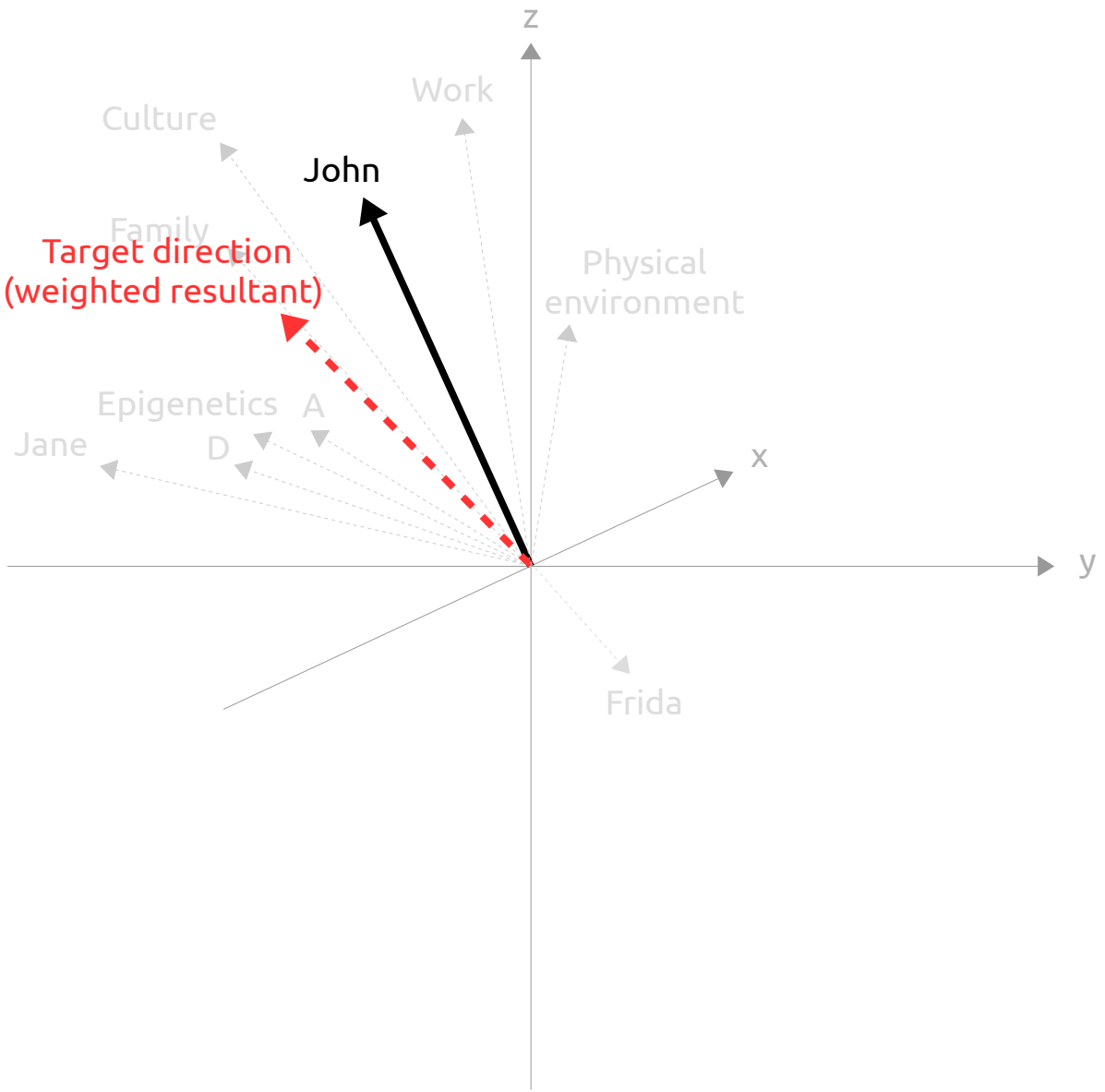

z
John
x
y

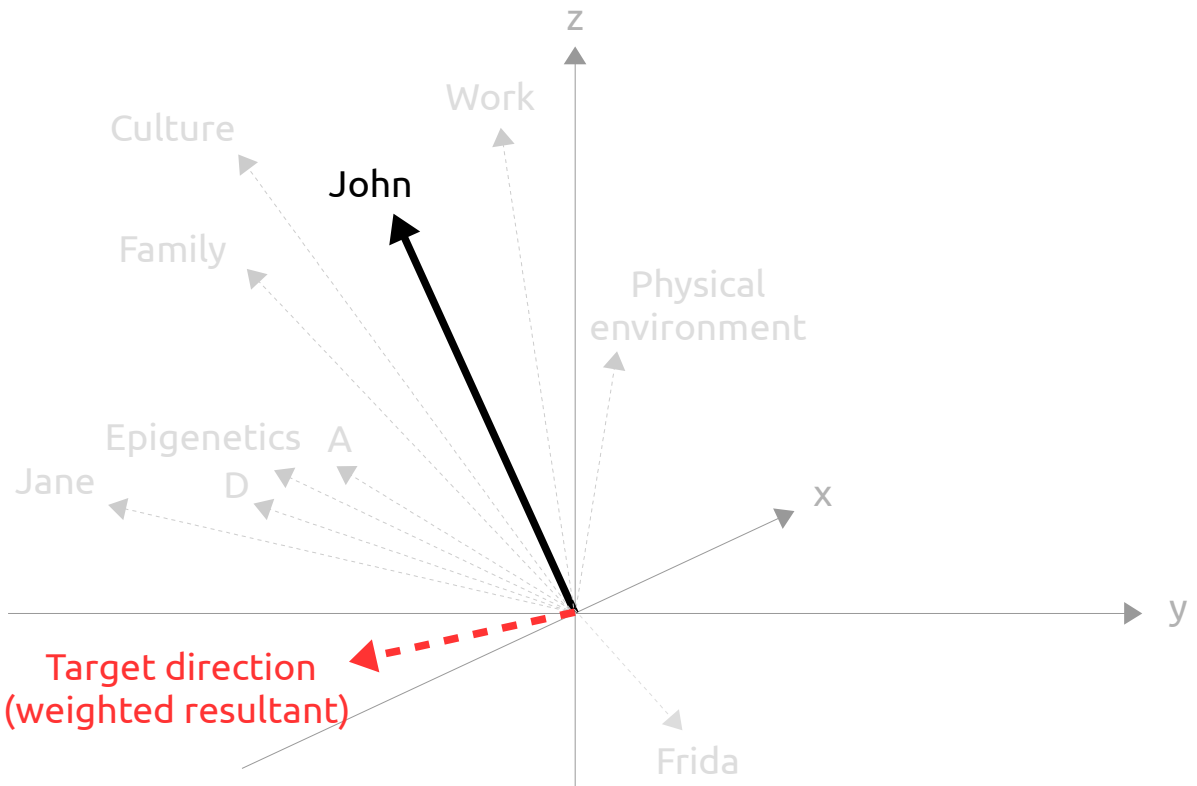

z
Environment
John
Genes
x
y

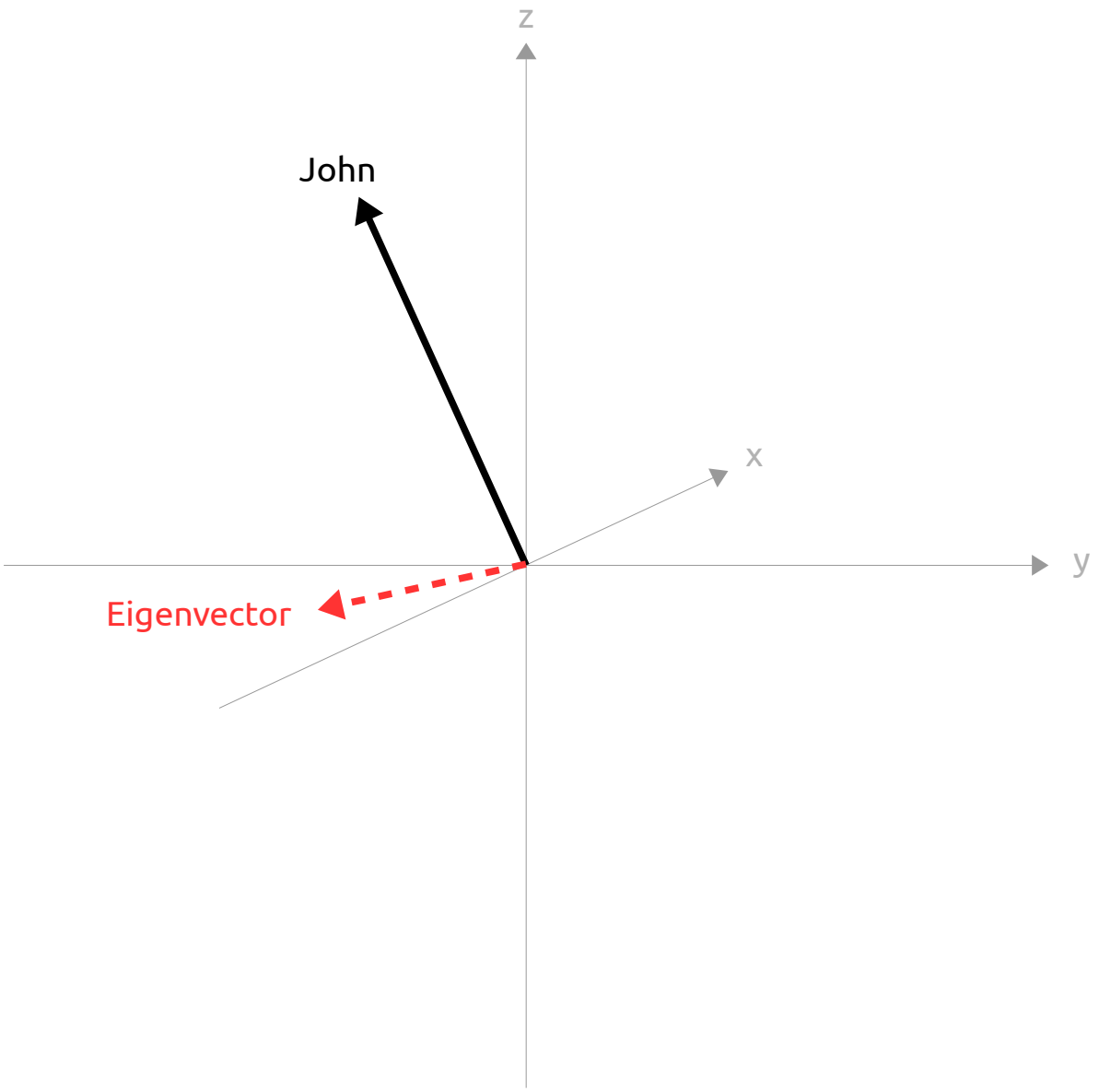

z
John
Environment
Genes
x
y


z
Work
Culture
John
Family
Physical
environment
Epigenetics
A
D
x
y


z
Work
Culture
John
Family
Physical
environment
Epigenetics
A
Jane
D
x
y
Frida


z
Work
Culture
John
Family
Target direction
(weighted resultant)
Physical
environment
Epigenetics
A
Jane
D
x
y
Frida


z
Work
Culture
John
Family
Physical
environment
Epigenetics
A
Jane
D
x
y
Target direction
(weighted resultant)
Frida


z
John
x
y
Eigenvector

Step 1 Translate target direction to connection matrix

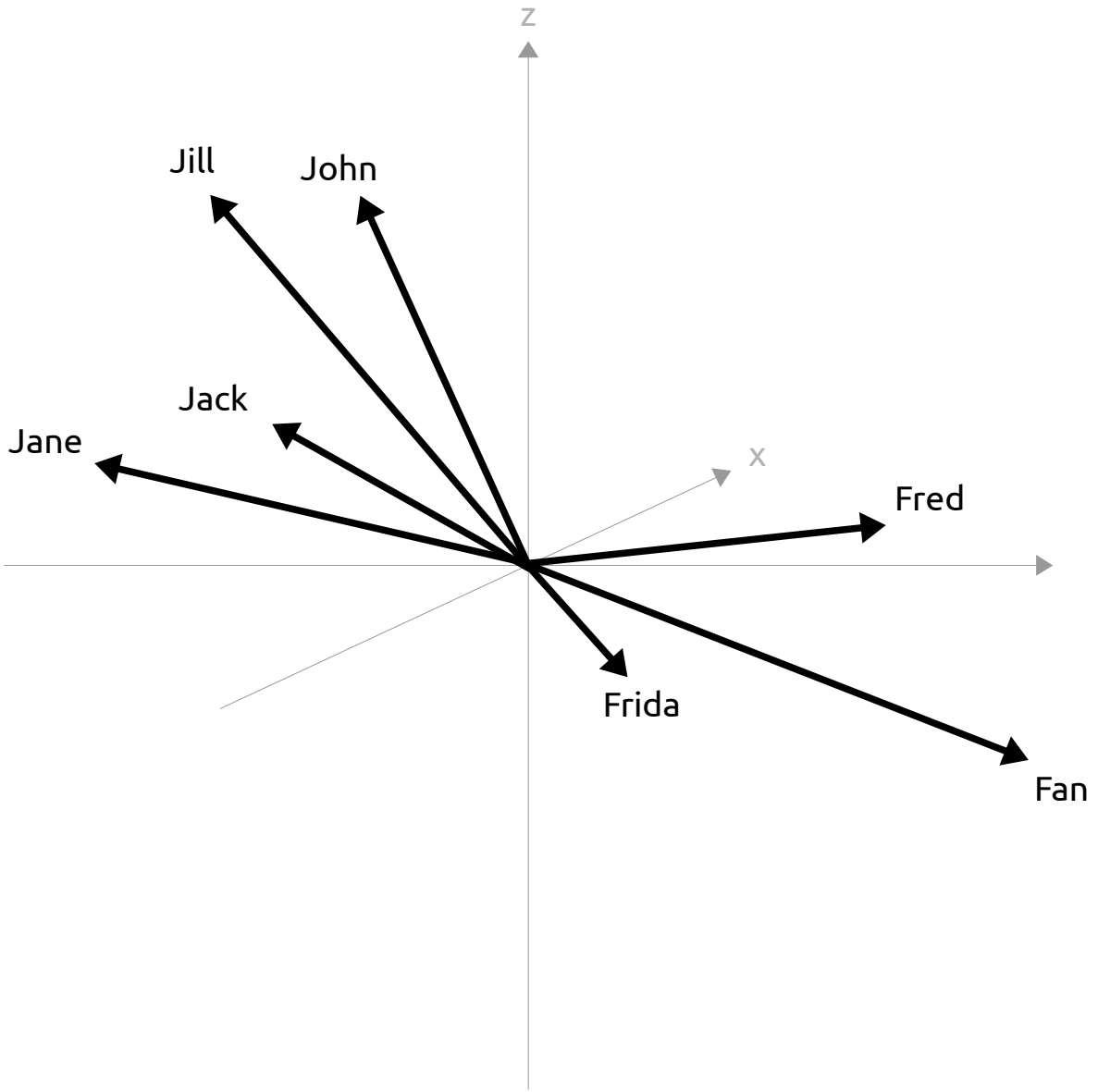
$$\begin{pmatrix} -.50 \\ -.50 \\ .00 \end{pmatrix} \Rightarrow \text{“inverse eigenvalue problem”} \Rightarrow \begin{pmatrix} -.26 & -.29 & .02 \\ -.22 & -.24 & .05 \\ .03 & .10 & -.50 \end{pmatrix}$$

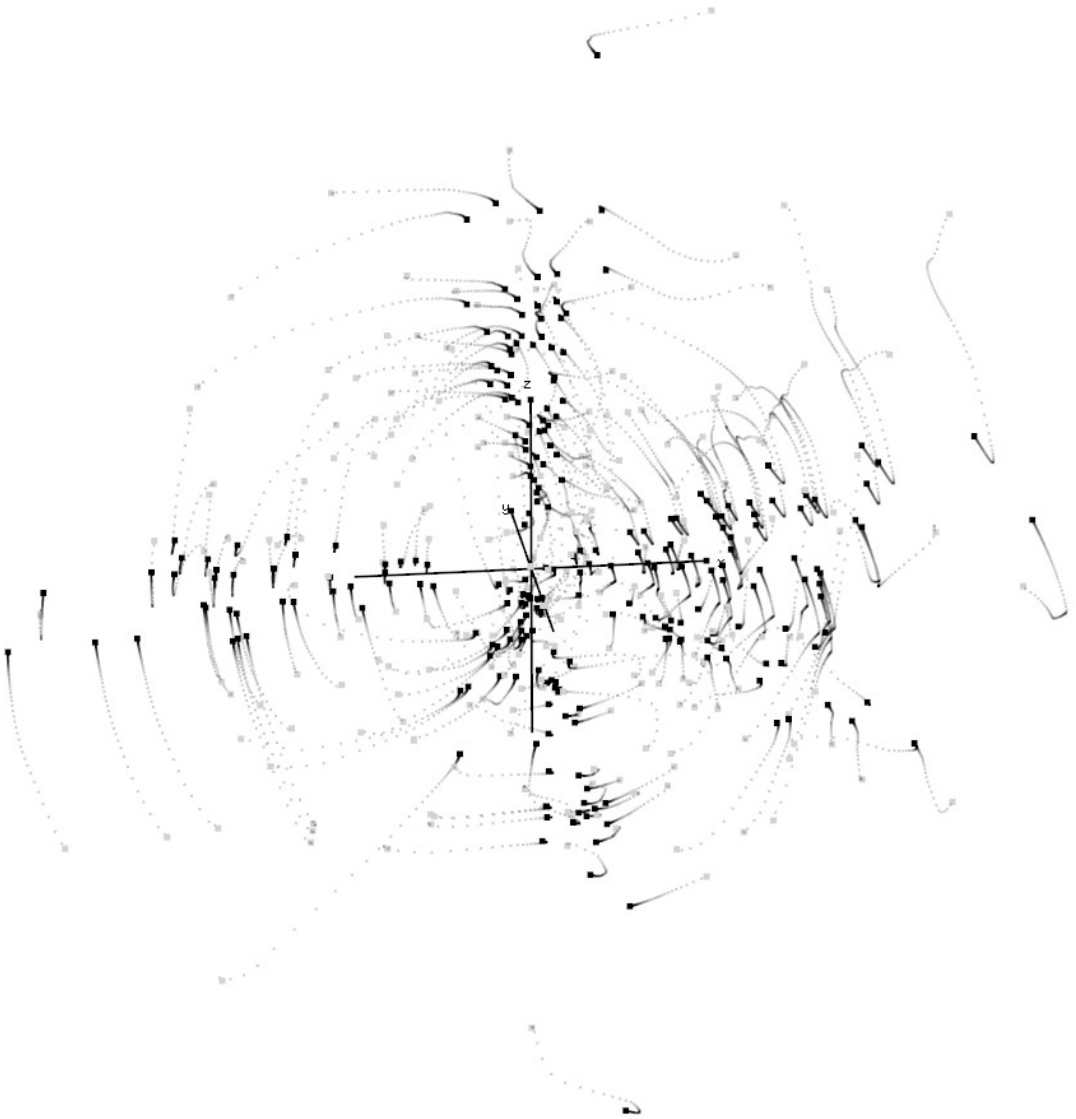
Step 2 Update person vector

$$\begin{pmatrix} -.26 & -.29 & .00 \\ -.22 & -.24 & .00 \\ .00 & .00 & -.50 \end{pmatrix} * \begin{pmatrix} -.50 \\ -.50 \\ 1.00 \end{pmatrix}$$

- Closeness to balance between all forces acting on an individual at a time can be controlled
- Operationalization of personality maturity
- Precision of connection matrix construction
- Naturally individuals converge asymptotically towards the balance

- Different reasons for the emergence of factors
  - Latent factor models
  - Network model
  - Functionalist model
- Can all be represented in the framework
- Can easily co-exist


z
Jill
John
Jack
Jane
x
Fred
Frida
Fan


z
y
x

- Personality space can host genetic and environmental structures
- Model effects of gene-environment transactions on heritability
- Some non-additive variance expected even when genotype $r_{dz} = r_{mz}/2$

- NSF can host a variety of models and ideas
- A common conceptual and mathematical language
- For integrating isolated or contradictory ideas
- For computational models
- For testing multiple ideas simultaneously
- It is not a model, but for building models

Collaborators:

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